Bank of England applies Met Office UK climate projections in its Climate Biennial Exploratory Scenarios

Description

More extreme heatwaves, droughts, drier summers, wetter winters and rising sea levels are all consequences of climate change which each UK citizen will have to continue to endure.

More intense rainfall is expected to increase risk of flooding for some UK residents. Pic: Shutterstock

It is easier to contemplate the increasing impacts of climate change on the individual, but what about the impacts on our wider society? On business, the economy and our financial institutions?

The Bank of England – which has a responsibility to assess the resilience of UK banks and insurers –will be considering the potential impacts from climate change on the UK financial system. The climate exploratory scenario – which starts today – will examine two principal aspects:

- Physical climate risk from chronic and acute events such as flooding or extreme temperatures on productivity, property and other critical assets;
- The changes in the economy linked to the societal response to tackling climate change, such as the effect of widespread withdrawal from fossil-fuel use, known as transition risks.

The Met Office has vast experience of producing climate projections for a variety of sectors, so there was delight when the Bank of England invited us to become an advisory partner alongside Network for Greening the Financial System (NGFS) and OASIS Hub.

Professor Jason Lowe OBE of the Met Office said: “The Met Office is helping organisations to examine climate risks, such as threats to infrastructure or investments. It is clear that organisations realise they are going to have to transform business models, including adapting supply chains and examining investments.”

The Bank of England has particular interest in benchmarking the climate data that financial firms can use to analyse their exposure to physical risk. Jason Lowe added: “Climate projections can present a range of futures and it is important to design a scheme that presents the breadth of possibilities. The suite of climate projections we used – UKCP – is specifically designed to examine the spread of outputs and is ideal for being a part of the benchmark.”

“Climate statistics were calculated at a range of points in the future and for a range of global warming levels chosen by the Bank to link to different levels and rates of potential emission mitigation action and application of climate policy. The Met Office task was to match these to our physical climate simulations. Dr Fai Fung is the Met Office lead for climate services. He said: “The physical warming levels chosen are broadly in line with those being used for the UK’s climate change risk assessment, CCRA3, which will give consistency.”

Jason Lowe added: “It is impossible to know exactly how much greenhouse gas emissions mankind will put into the atmosphere, so studies like this have to consider a range of scenarios if they are to understand the full gamut of risk. Currently there is a good deal of eagerness around the world to cut greenhouse gas emissions, making the so-called high-emission scenarios less likely. However, one lesson from history is that times can change dramatically, so it is important to consider all options, including those which don’t look most likely at the current time.”

Date Created
June 2021

Will the warm weather continue?

Description

In something of a switch-around from May, which was cool and wet away from an unusually dry northwest Scotland we are now seeing something much more typical for the time of year. High pressure is dominating most areas bringing fine and dry early summer conditions, whilst the far northwest is likely to be cloudier at times with some rain.

High-pressure from the Azores will extend across the bulk of the country this week bringing predominantly settled weather and allowing temperatures to slowly rise. However, the north west may see some showers and windy spells as weak fronts try to push in from the Atlantic. With these trying to arrive from the west at times a good deal of cloud is likely over western parts whilst the east sees the best of the sunnier conditions.

The dull conditions in May were largely due to a southward shift of the jet stream opening the door for low pressure systems to move across the Atlantic and cross the country throughout the month. Currently the jet stream lies to the north of the UK and this allows high-pressure to develop and warm air from lower latitudes to push up across the country.

Temperatures, particularly in the south, are likely to reach the mid, to possibly high 20s of Celsius over the next few days and into the weekend. Some areas may reach heatwave criteria. Above average temperatures are likely to continue next week, with a chance of seeing hot weather in the south, possibly accompanied by thunderstorms, and a chances a heatwave may continue for an extended period.

Research shows that, as a result of climate change, heatwaves are becoming more common in the UK. Extreme heat can have wide ranging impacts from health and wellbeing to problems for the energy industry and businesses, the transport network (melting tarmac, damage to rail tracks etc.) and leisure industry (increased use of open water by the public), increased risk of wildfire etc.

In August 2003, the UK experienced heatwave conditions lasting 10 days and resulting in 2,000 deaths. During this heatwave, a record maximum temperature of 38.5 °C was recorded at Faversham in Kent. In July 2006, similar conditions occurred breaking records and resulting in the warmest month on record in the UK. In the summer of 2019, the 2003 maximum temperature record was broken at Cambridge University Botanic Garden on 25 July, with 38.7 °C.

The highest temperature recorded in June (records back to 1884) was 35.6°C in Southampton on 28th June 1976.

For tips on how to cope in hot weather check out the advice on the Met office website.

Check out the latest forecast and temperature details for your area by using our forecast pages and following us on Twitter and Facebook, as well as using our mobile app which is available for iPhone from the App store and for Android from the Google Play store.

Date Created

June 2021

Met Office staff recognised in Royal Meteorological Society's 2020 awards

Description

This week the Royal Meteorological Society has announced the winners of its prestigious awards for 2020, in recognition of people who have made significant contributions to the fields of weather, climate and other associated disciplines.

Amongst the winners are several Met Office staff who have been awarded for their work ranging from STEM outreach to pioneering work on satellite data.

> **Dr John Eyre**, Science Fellow. Awarded Honorary Fellow for his pioneering work in furthering the Met Office's use of satellite data and touching the careers of countless scientists who have benefited from his scientific wisdom and insight.
>
> **Dr Steven Hardiman**, Senior Scientist, Climate Dynamics. Winner of the L.F. Richardson Prize for his research on a broad range of topics in climate science.
>
> **Felicity Liggins**, Scientific Manager, Education Outreach. Winner of the Michael Hunt Award for her STEM education and outreach activities, building it into the award-winning Outreach Programme it is today.
>
> **Malcolm Kitchen**, Opportunistic Observations Science Fellow & **Ed Stone**, Expert Observations Scientist. Joint winners of the Vaisala Award in recognition for their work in developing the "Mode-S" meteorological observing system.
>
> **Squadron Leader Ken Horn**, Operational Meteorologist. Winner of the Innovation award in recognition of his long and successful career both as an Operational Meteorologist in the Met Office and the RAF.

With many outstanding entries from across the globe, these awards represent the highest achievements in climate science and meteorology, providing a showcase for some of the pioneering work taking place across different organisations.

Dr John Eyre, this year's Honorary Fellow, said:
"I am very surprised and deeply honoured to be elected. I have been privileged to find myself working at the intersection between observations from weather satellites and numerical weather prediction during the last four decades – a period that has seen major advances in both fields. I am very grateful to many people – particularly at the Met Office and ECMWF, but also through the activities of EUMETSAT, WMO and other centres – who have contributed to the work in which I have been involved. I have learned a lot from them, and it has been a pleasure to be part of this community."

You can read more about each award and the citation for the recipient on the Royal Meteorological Society website, which highlights the work of each recipient alongside an acceptance message. Congratulations to all award recipients.

Date Created
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Risks to the UK from climate change now higher than ever, says major new report

Description

Today [Wednesday 16 June, 2021] the Climate Change Committee (CCC) publish their Independent Assessment of UK Climate Risk Evidence Report. Informed by a 1500-page technical report, the assessment highlights an array of climate risks which could affect the UK, with threats ranging from temperature increases, rising sea levels, heavier rainfall and increased duration of drought.

The latest climate change risk assessment highlights the increased risk of flooding to communities across the UK, such as this event in York in 2015. Picture: Shutterstock.

The Independent Assessment is the result of more than three years of work, with input from over 450 experts from 130 organisations. The team of experts, led by the University of Exeter in partnership with the Met Office, prepared the CCRA3 Technical Report.

Climate change is a global issue, with global impacts. The technical chapters set out the latest understanding of current and future risks climate change brings to the UK, both directly to the country itself and also via impacts elsewhere in the world, and on adaptation actions aimed to reduce these risks.

Professor Richard Betts MBE is Chair in Climate Impacts at the University of Exeter and Head of

Climate Impacts Research at the Met Office Hadley Centre, and led the writing of the Technical Report.

Professor Betts said: “Met Office science has provided key new science to underpin the Risk Assessment. The UKCP18 climate projections are central to the report, and the previous UKCP09 projections were also used in much of the literature assessed. The Met Office also did new research on wildfire, extreme weather, and implications of tipping points in the climate system for the UK.”

The report assesses the climate change risks in scenarios of 2°C and 4°C global warming by the end of the century. This represent the range of future global warming that could arise from current worldwide policies relating to greenhouse gas emissions. Even higher rates of warming are possible if future emissions are higher than expected, or if feedbacks in the climate system are strong.

You can hear more from Professor Richard Betts in conversation with Grahame Madge on the Met Office’s Weather Snap podcast.

The world is currently not on track to limit global warming to 1.5°C above pre-industrial levels. As the UK prepares to host COP26, the UK Presidency has set clear goals. It will call on all countries to update their emissions reduction targets, so that they are in line with holding temperature rise to 1.5 degrees and securing global net zero. The CCRA3 Technical Report highlights the implications of climate change for the UK’s ability to meet their commitment to net zero emissions.

The report also informs the benefits for society and the economy of taking strong action to adapt to climate change now, which aligns with the COP26 goal on adaptation. Countries will provide a summary of what they are doing and planning to do to adapt to the impacts of the changing climate, the challenges they face and where they need help. By sharing these plans will help us learn together and share best practice between countries to move to a resilient, net zero economy.

Albert Klein Tank is the Director of the Hadley Centre. He said: “The UK climate change risk assessment incorporates the most up to date peer-reviewed climate science to help everyone understand the impacts that climate change will exert on the UK’s resilience. We know that climate change is already happening and the effects will increasingly gain momentum.

“The risk assessment looks at two futures for the UK: one where global efforts to tackle climate change are actively pursued and one where there the action is more restrained. Neither pathway allows us to live in a world immune from the impacts of climate change, but one supresses the worst impacts.

“We’re proud that Met Office science is at the heart of the risk assessment and we look forward to expanding the breadth of our science to find sustainable ways of reducing greenhouse gas emissions while finding ways for society to adapt to the climate-related changes which we are already committed to.”

Climate change impacts for the UK are inevitable, but ambitious joint action to reduce emissions and adapt to climate change can help to reduce the risks for future generations.

Today’s report sets out the CCC’s advice to Government ahead of the publication of the Third Climate Change Risk Assessment (known as CCRA3), which is due to be laid before Parliament in January 2022. As required by the UK Climate Change Act every five years, CCRA3 will provide a comprehensive view of the risks and opportunities facing the UK from climate change. This provides

the UK Government and devolved administrations with the evidence base who must then set out their response in their national adaptation programmes.

The final reports are available at: www.theccc.org.uk (advice report) and www.ukclimaterisk.org (technical report and supporting information).

Date Created
June 2021

Why the Met Office is launching a new extreme heat warning

Description

Although hot weather can often be seen as ‘good news’ and is enjoyed by many, it can have serious consequences. Research shows that, as a result of climate change, we are now much more likely to see prolonged spells of hot weather here in the UK.

The impacts of extreme heat can be many and varied. It can have health consequences, especially for those who are particularly vulnerable, and it can impact infrastructure, including transport and energy, as well as the wider business community. During hot weather we often see increased traffic near coastal areas, increased use of open water by the public, and an increase in wildfire risk.

The Met Office launched a new Extreme Heat National Severe Weather Warning at the start of June 2021, with warnings to be issued based on the impacts of extreme heat. Amber and red warnings can now be issued to inform the public of potential widespread disruption and adverse health effects.

Amber and red extreme heat warnings are now available to be issued by the Met Office (Image: Shutterstock)

A changing climate

The impacts from extreme heat are increasing across the UK due to climate change. The UK State of the Climate report shows that warm spells have more than doubled in length (from 5.3 days in 1961-90 to over 13 days in 2008-2017). In addition, extreme summer temperatures like those seen in 2018 are now 30x more likely than in pre-industrial times. The latest Met Office projections of future UK climate

change also suggest that these summer temperatures could be ‘normal’ by the 2050s.

Dr Will Lang, Head of Civil Contingencies at the Met Office, said, “We know that the impacts of climate change are resulting in an increase in the frequency and severity of extreme heat events.

“The extreme heat warning joins our other warnings to ensure that no matter what the weather conditions, we at the Met Office have a method of communicating these impacts to the public in as efficient a way as possible.

“Extreme heat has obvious potential consequences health in the UK, especially for vulnerable groups, but continued impacts around transport infrastructure, energy consumption and coastal areas will also inform when extreme heat warnings are issued.”

Working with others

The Met Office has been working closely with Public Health England, the devolved administrations and other key stakeholders to develop the UK-wide extreme heat warning.

Extreme heat warnings will work in a similar way to the existing weather warnings, where they’re only issued based on the impacts of the weather conditions, rather than when specific temperatures are reached. This means that different conditions in different areas of the country may trigger an extreme heat warning, and the threshold for an extreme heat warning in Aberdeen, for example, is likely to be lower than one covering London.

In the most extreme circumstances, prolonged spells of heat can cause illness and even death. According to Public Health England figures, 2,256 excess deaths were reported across the country during heatwaves in the summer of 2020 – the highest since records began. It’s hoped the new extreme heat warning can help the public, businesses and organisations better prepare for hot conditions, thereby reducing disruption and impacts.

Find out more about the Met Office’s weather warnings.

An extreme heat warning is different than the Met Office’s definition for heatwaves. Find out about when heatwaves are declared.

Date Created
June 2021

Is the hay fever season worse than normal this year?

Description

The sniffling noses and streaming eyes that accompany summer for many hay fever sufferers are currently in full force, with the pollen count high across many areas of the UK, as it has been for some weeks. But is it worse than normal this year? Well, the answer might not be as simple as you'd think.

Scientifically speaking, the amount of pollen in the air at the moment is fairly average by UK standards, but some people with hay fever have been reporting some significant symptoms in the last few weeks. The reason for this is less likely to be down to the amounts of pollen in the air, but more the sudden increase in pollen in the air due to a Spring and early Summer of contrasting weather conditions.

Speaking to the WeatherSnap podcast, Yolanda Clewlow, Relationship Manager for Health and Air Quality Services at the Met Office, said: "The main difference this year compared to other years is the sudden, almost overnight, increase in pollen levels, especially grass pollen.

"In terms of pollen grains in the atmosphere, we've gone from single figures and low double figures per cubic metre to hundreds per cubic metre in a very short amount of time. I think that's what people are maybe registering this year – that dramatic, rapid increase in levels."

The reason behind that increase in levels can be largely pinned down to the weather patterns at the leading in to Summer.

Pollen levels have been high in the UK in recent weeks (Image: Shutterstock)

A cool and significantly wet May – the fifth wettest on record for the UK – was followed by a marked shift to drier and warm conditions in early June, leading to pollen almost instantly being ready to be released.

Yolanda said, “Overnight the pollen that was poised, ready to be released, was able to be blown off plants in to dry, warm air. Anyone with an allergy to pollen, and grass pollen in particular, was suddenly exposed to very high levels.”

Changes to the pollen season are also increasingly likely due to the impacts of climate change. The evidence shows that the season could be more likely to start earlier in the UK, and the changing climate in the UK may also see new plant species become established, bringing with them more pollen to release in to the atmosphere.

“Longer term, we are seeing changes to the pollen season,” said Yolanda.

“The evidence is showing that this season is extending and the earlier starts in particular are likely due to climate change.

“As our climate warms, we will see more species of plants become embedded and take off in this country. Some are already here in very small pockets, but they will start to take hold and the season will get more intense. So this is significant for people who are already suffering.”

In addition, recent research around pollen has been around the phenomenon of ‘thunderstorm asthma’ which was experienced in Australia in 2016 as storms swept across the south of the country. During the period of intense storms, Australia experienced a spike in hospital admissions and ambulance call outs due to people experiencing respiratory symptoms and difficulty breathing.

Yolanda added: “With Public Health England and others, we are working closely to try and identify periods when there are increased asthma admissions during periods when there is storm activity coupled with high pollen levels. It could be lightning… bursting pollen grains open and releasing the smaller, very allergenic grains within and they get can get much deeper inside the lungs. There’s a lot of different things we’re looking at.”

Hear more from Yolanda, including the ongoing research into the potential impacts of thunderstorms on pollen, on the WeatherSnap podcast, with Clare Nasir.

Find out more about how the weather affects hay fever.

Find out when hay fever season is for the UK.

View the latest pollen forecast for the UK.

Date Created
June 2021

When will climate tipping points, actually tip?

Description

What are climate tipping points and how will we know when they have been breached? A collection of climate scientists provide insight to these fundamental questions by looking at a series of potential tipping points around the world in the second episode of the Mostly Climate podcast, hosted by the Met Office.

The ice sheets of Antarctica are one of the world's most noted tipping elements. Picture: Shutterstock.

The Met Office's Dr Doug McNeall is the host of the podcast. He said: "The phrase 'tipping point' was popularised by Malcolm Gladwell journalist and author who published his first book "*The Tipping Point*" in 2000. Here he explained how small changes – spreading ideas, messages, behaviours and products – can make a big difference."

At first the inspiration for the book came from reduced crime rates in New York City, but later expanded to explain similar phenomena in epidemiology. Doug McNeall added: “Tipping points have since been applied to other areas of science and they have become a large area of research in climate science, whereby small changes can make a big difference to Earth’s subsystems, such the Amazon rainforest or the Atlantic Meridional Overturning Circulation, which includes the Gulf Stream.”

In 2018 and 2020, the IPCC Special Reports suggested that tipping points could be exceeded even if warming was contained between 1-2?C. Professor Tim Lenton – a world-renowned expert on tipping points from the University of Exeter – is a major contributor to the podcast. He highlights that with the probability of crossing tipping points, evidence is mounting they could be more likely to ‘tip’ than previously thought and more attention needs to be given to these high-impact events.

Professor Tim Lenton breaks up Earth’s system into three categories:

- Ice, including elements such as the West Antarctic Ice Sheet and the Greenland Ice Sheet;
- Ocean and Atmospheric Circulation, which includes the Atlantic Meridional Overturning Circulation or Monsoonal systems;
- Biosphere, which includes the Amazon rainforest, or coral reefs.

Tipping points are often considered in isolation, whereby typically parameters are changed very slowly and at some point you reach a critical threshold where the system can collapse. But this isn’t realistic according to Johannes Lohman, due to a phenomenon called ‘rate-induced tipping’. Here we consider that climate change is unfolding at an accelerated pace. Also, there may be other types of tipping points at play. As a result, a system could tip before reaching a critical threshold.

Johannes explains: “Rate induced tipping necessitates that the rate of climate change needs to be limited, as well as the absolute amount, since a critical threshold may not be relevant in practice, if parameters and climate change is not slow to change. Due to the chaotic nature of complex systems, there is no well-defined critical rate of change for any one element, severely limiting the predictability of tipping points.”

Next week, in our series on tipping elements on the Met Office news blog we will focus on The Atlantic Meridional Overturning Circulation.

The Met Office’s second episode of Mostly Climate can be found here.

Date Created
June 2021

Heatwave record for Pacific North West

Description

A record-breaking heatwave is devastating parts of northwestern North America, and the heat is expected to continue now through much of this week.

Temperatures in parts of the northwest USA and southwest Canada are likely to reach as high as around 45.0°C by day for perhaps five or more days, with extremely warm nights in between.

In the affected area a few thunderstorms and locally gusty winds will bring wildfire risks.

Paul Hutcheon is a meteorologist with the Met Office's global guidance unit. He said: "Many all-time long-standing station records are expected to be broken for many days in a row, some by more than 5.0°C. The all-time Canadian record was broken on Sunday, with Lytton in British Columbia recording 46.6°C (1.6°C higher than the previous record set on 5 July 1937). Less than 24 hours later, Lytton broke this record again, reaching 47.9°C on Monday To put this into context the average June maximum is around 24.3°C."

ECCC Weather British Columbia @ECCCWeatherBC · 2h
Lytton has again broken the all-time Canadian high temperature record by reaching 47.9C today. The summary of all broken records today in BC - bit.ly/360YNRm
#bcstorm #Lytton
11
206
208
ECCC Weather British Columbia @ECCCWeatherBC · 7h
Less than 24 hours later, Lytton has again broken the all-time Canadian high temperature record by reaching 47.5C at 4pm. This is a preliminary number as heating may continue for another hour. The official summary of all broken records will be posted later! #bcstorm #Lytton
25
524
547

Armel Castellan is a meteorologist with Environment and Climate Change Canada. He said: "Higher temperatures started in earnest on Friday and it will be peaking early this week for the coast and the middle of the week for the interior of British Columbia, and then the heat will be moving east into Alberta: so we are not done with this yet.

"Northwest Territories have recorded their all-time highest temperatures not just in June, but any point

in the year. We are setting records that have no business in being set so early in the season."

The heat is also affecting northwestern United States with Seattle setting a new all-time record at 40°C and this is expected to be exceeded on Monday with 44.0°C. Portland, in Oregon, broke the record twice: 42.0°C on Saturday and 44.4°C on Sunday, according to the US National Weather Service.

During the week, the central focus of the heat dome shifts gradually eastwards away from British Columbia and into Alberta

The heat is being driven by a huge ridge of high pressure. Armel Castellan explained: "We have experienced a ridge with low pressure sandwiched on either side. And it's really hard to move it. The jet stream isn't moving it along. In that pattern we have essentially a heat dome. A pattern that is sticking to its guns where pollutants and heat keep adding to each other. It is compounding.

"The first day of a ridge like this is warm and we are very close to the solstice so we are dealing with the highest sun angle in the sky, and we have had many days of this in a row and each morning we wake up to a higher temperatures. This is what is dangerous and it is affecting people throughout many days where they are dehydrated and we have had many days where the temperature is higher than the day before.

"Overnight lows being higher than our average daytime highs for late June is a really big deal. Our bodies need to cool off and recover before taking on another day of high temperatures. Another thing to think about is the infrastructure. Fewer than 40 per cent of homes have air conditioning on the coast, people are having to go to libraries and shopping malls to find a couple of hours of air conditioning. I have been sleeping in a tent to get some respite from the heat."

Even at night residents of British Columbia, including here in Vancouver, have been struggling to cope with the extreme night-time heat. Picture: Shutterstock.

The impacts from the record-breaking heat are expected to be significant. Paul Hutcheon of the Met Office added: “Significant excess human and animal mortality is likely. In this region properties are generally designed to retain heat, not to shed heat, and air conditioning is much less prevalent than in other parts of North America. These temperatures will also likely stress infrastructure in this region, for example, power and water supplies. Additionally the risk of wildfires will increase throughout this spell. The warmth may well lead to rapid melting of the some mountain snowpack across the region, which could lead to some localised avalanche, flooding, and landslides in the mountains.”

Commenting specifically on the threat of wildfire, Armel Castellan concluded: “Unfortunately the outlook is very dry, we have some thunderstorm activity that will bring some respite but It is very dangerous to add dry lightning to a very strong drought signal: we are very susceptible to a wildfire event transpiring.”

Climate change

In a statement, the World Meteorological Organization has said: “These early summer hot weather conditions are taking place against the background of human-induced climate change with global temperatures already 1.2 C higher than pre-industrial levels.

“Heatwaves are becoming more frequent and intense as greenhouse gas concentrations lead to a rise in global temperatures. They are starting earlier and ending later and are taking an increasing toll on

human health and health systems."

Other parts of the northern hemisphere are already experiencing exceptional early hot summer conditions extending from north Africa, the Arabian Peninsula, eastern Europe, Iran and the north-western Indian continent, with maximum daily temperatures exceeding 45.0°C in several locations and reaching 50.0 C in the Sahara. Western Russia and areas around the Caspian Sea have also seen unusually high temperatures due to the continued presence of a large area of high pressure. In parts of the region including Moscow temperatures have been reaching the mid-30s°C by day, remaining above 20°C by night. Areas nearer the Caspian Sea are expected to experience temperatures reaching the mid 40s°C and remaining above 25°C at night. It is likely that some all-time temperature records will be set during this heatwave.

Nikos Christidis is a climate scientist with the Met Office. He said: "Without human-induced climate change, it would have been almost impossible to hit such record-breaking mean June temperatures in the Western United States as the chances of natural occurrence is once every tens of thousands of years.

"In the present-day climate getting an extremely hot June is common and is likely to occur twice in three decades. However, an analysis from many computer models suggests that by the end of the century these extreme temperatures are more likely than not. Human influence is estimated to have increased the likelihood of a new record several thousand times."

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